

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 March 2001 (15.03.2001)

PCT

(10) International Publication Number
WO 01/17437 A3

(51) International Patent Classification⁷: **A61B 17/02,**
19/00

(21) International Application Number: **PCT/US00/24372**

(22) International Filing Date:
5 September 2000 (05.09.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/390,792 7 September 1999 (07.09.1999) US

(71) Applicant: **CARDIOTHORACIC SYSTEMS, INC.**
[US/US]; 10600 North Tantau Avenue, Cupertino, CA
95014 (US).

(72) Inventors: **PENG, Steven**; 1450 Carmelita Avenue,
#9, Burlingame, CA 94010 (US). **VOSS, Larry**; 5094
Montreal Drive, San Jose, CA 95310 (US). **HANCOCK,**
David; 700 Church Street, Apt. 202, San Francisco, CA
94114 (US). **CARLSON, Grace**; 370 Church Street,
#C, San Francisco, CA 94114 (US). **DAVIS, John**; 1970
Silverwood Avenue, Mountain View, CA 94043 (US).

CHIN, Albert; 2021 Newell Road, Palo Alto, CA 94303
(US). **VARGAS, Jaime**; 879 Clara Drive, Palo Alto, CA
94303 (US).

(74) Agent: **CANNON, Alan, W.**; Bozicevic, Field & Francis
LLP, 200 Middlefield Road, Suite 200, Menlo Park, CA
94025 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ,
DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,
TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

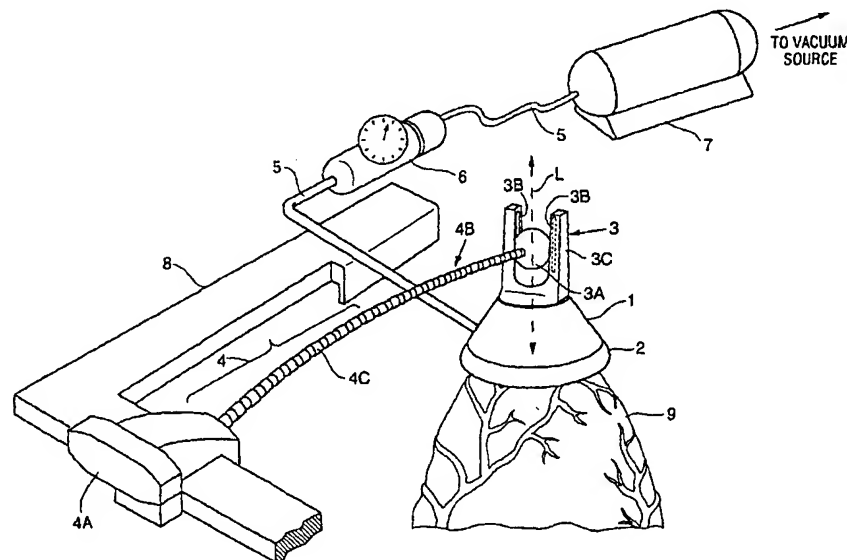
(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG,
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: **ORGAN MANIPULATOR**



(57) Abstract: An organ manipulator including at least one suction member or adhesive disc mounted to a compliant joint, a flexible locking arm for mounting such suction member or compliant joint, and a method for retracting and suspending an organ in a retracted position using suction (or adhesive force) so that the organ is free to move normally (e.g., to beat or undergo other limited-amplitude motion) in at least the vertical direction during both steps. In preferred embodiments, a suction member exerts suction to retract a beating heart and suspend it in a retracted position during surgery. As the retracted heart beats, the compliant joint allows it to expand and contract freely (and otherwise move naturally) at least in the vertical direction so that hemodynamic function is not compromised.

WO 01/17437 A3



(88) Date of publication of the international search report:
27 September 2001

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/24372

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61B17/02 A61B19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 919 193 A (ETHICON ENDO-SURGERY, INC.) 2 June 1999 (1999-06-02) the whole document	1,14-17, 19,24,25
Y		2-5,7,8, 21-23, 29-36
Y	EP 0 791 330 A (CARDIOTHORACIC SYSTEMS, INC.) 27 August 1997 (1997-08-27) abstract; figures 9A-9E,28A,28B,42-46C,50A-51B,57-63 column 20, line 14 -column 21, line 12 column 30, line 1-20 column 37, line 24 -column 40, line 6 column 41, line 6-53 column 44, line 50 -column 47, line 49 -/--	2-5,7,8, 21-23, 29-36

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

21 November 2000

Date of mailing of the international search report

20. 03. 2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

GIMENEZ BURGOS, R

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/24372

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 782 746 A (WRIGHT) 21 July 1998 (1998-07-21) cited in the application abstract; figures column 4, line 5-59 column 5, line 5 -column 6, line 16 ---	1,5-8,13
A	WO 97 26828 A (GENTILLI ET AL.) 31 July 1997 (1997-07-31) the whole document ---	1,5,9-12
A	US 5 885 271 A (HAMILTON ET AL.) 23 March 1999 (1999-03-23) abstract; figures ---	1,5,26
A	US 5 927 284 A (BORST ET AL.) 27 July 1999 (1999-07-27) abstract; figures column 8, line 4-16 ---	1,26
A	US 5 799 661 A (BOYD ET AL.) 1 September 1998 (1998-09-01) cited in the application abstract; figures 28-35 column 18, line 14 -column 19, line 48 ---	1
A	WO 98 49944 A (PILLING WECK INCORPORATED ET AL.) 12 November 1998 (1998-11-12) the whole document -----	1,36,37, 40,41, 44,46

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 00/24372

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 50-55
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-47

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-47

An organ manipulation apparatus having a suction member

2. Claims: 48,49

An organ manipulation apparatus having a bio-absorbable disc with an adhesive surface

3. Claims: 56-67

Locking arm having a flexible state and a rigid state comprising; a cable and ball joints threaded along the cable

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/24372

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0919193 A	02-06-1999	US 5984864 A AU 8831898 A CA 2249494 A JP 11192225 A US 6013027 A	16-11-1999 29-04-1999 07-04-1999 21-07-1999 11-01-2000
EP 0791330 A	27-08-1997	US 5894843 A AU 1480597 A BR 9701028 A CA 2197614 A JP 10005230 A NO 970753 A US 6050266 A US 6036641 A	20-04-1999 28-08-1997 03-11-1998 21-08-1997 13-01-1998 21-08-1997 18-04-2000 14-03-2000
US 5782746 A	21-07-1998	NONE	
WO 9726828 A	31-07-1997	IT T0960033 A AU 1544397 A	22-04-1996 20-08-1997
US 5885271 A	23-03-1999	AU 6555498 A WO 9840018 A US 6159201 A	29-09-1998 17-09-1998 12-12-2000
US 5927284 A	27-07-1999	US 5836311 A AU 7241496 A BR 9610670 A CA 2232580 A CN 1198664 A EP 0939605 A JP 11511366 T NO 981289 A WO 9710753 A US 6015378 A	17-11-1998 09-04-1997 06-07-1999 27-03-1997 11-11-1998 08-09-1999 05-10-1999 19-05-1998 27-03-1997 18-01-2000
US 5799661 A	01-09-1998	US 5735290 A US 5452733 A AU 5962196 A CA 2222326 A EP 0837712 A WO 9640354 A US 6010531 A US 5766151 A US 6029671 A US 6027476 A AU 688303 B AU 6024594 A CA 2154354 A EP 0684781 A JP 8511694 T WO 9418881 A US 5571215 A US 5425705 A US 5569274 A US 5613937 A US 5536251 A US 5797960 A US 5713951 A	07-04-1998 26-09-1995 30-12-1996 19-12-1996 29-04-1998 19-12-1996 04-01-2000 16-06-1998 29-02-2000 22-02-2000 12-03-1998 14-09-1994 01-09-1994 06-12-1995 10-12-1996 01-09-1994 05-11-1996 20-06-1995 29-10-1996 25-03-1997 16-07-1996 25-08-1998 03-02-1998

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/24372

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5799661 A		US 5728151 A	17-03-1998
		US 5718725 A	17-02-1998
		US 5682906 A	04-11-1997
		US 5961481 A	05-10-1999
		US 6079414 A	27-06-2000
		US 5814097 A	29-09-1998
		US 5855614 A	05-01-1999
		US 5823956 A	20-10-1998
		US 5829447 A	03-11-1998
		US 6125852 A	03-10-2000
		US 5855210 A	05-01-1999
		US 5814016 A	29-09-1998
		US 5980455 A	09-11-1999
		US 6161543 A	19-12-2000
		US 5972030 A	26-10-1999
		US 5924424 A	20-07-1999
W0 9849944 A	12-11-1998	AU 7175398 A	27-11-1998
		US 5899425 A	04-05-1999